

**PROJECTOR AND CAMERA ARRANGEMENT WITH SHARED OPTICS AND
OPTICAL MARKER FOR USE WITH WHITEBOARD SYSTEMS**

Abstract of the Disclosure

5 Projector and camera arrangements are provided for use in electronic whiteboard
systems. Specifically, the present invention provides projector and camera arrangements
wherein the projector and camera share the same imaging optics. By sharing the same
projection and camera optics, the distortions that affect the projection system are the same
as those of the camera system. Thus, the calibration step required in conventional
whiteboard systems where the projector and camera are separate, i.e., each having their
10 own distinct optics and settings, is no longer needed. Further, the arrangements provided
in accordance with the invention are self-aligning, even when lens distortions are large
and even in the presence of strong perspective effects. The shared optics projector and
camera arrangements of the invention also provide for dynamic zooming. In addition,
various active and passive optical marker or lightpen designs are provided for use in
15 electronic whiteboard systems.

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